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70.17533

⑬ DEMANDE DE CERTIFICAT D'ADDITION A UN BREVET D'INVENTION

1^{re} PUBLICATION

②2 Date de dépôt..... 12 mai 1970, à 10 h 30 mn.

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public de la demande..... B.O.P.I. — «Listes» n. 1 du 7-1-1972.

⑤1 Classification internationale (Int. Cl.).. B 29 d 7/00.

⑦1 Déposant : GUICHARD Maurice, 4, rue J.-P. Galloch, 56-Auray.

⑦4 Mandataire :

⑤4 Structures complexes à âme ondulée simple ou multiple, en résine thermoplastique expansée
ou non et assemblage par contact des divers éléments. Perfectionnement apporté à
l'exécution de ces structures.

⑦2 Invention de :

③3 ③2 ③1 Priorité conventionnelle :

⑥1 Références du brevet principal : Brevet d'invention n. 70.10446 du 20 mars 1970.

Certificat(s) d'addition antérieur(s) :

FR 208 1256

rouleau, une inversion de l'ondulation, dont le pas sera déterminé par le diamètre des galets ou rouleau. Dans le cas de canelures très particulières, on pourra employer plusieurs trains de galets au cours d'opérations successives.

- 5 d) fabrication en continu, à partir d'une feuille ondulée par l'un quelconque des moyens ci-dessus définis, au moyen d'un galet ou d'une forme quelconque à pression et à des intervalles déterminés d'une ondulation ou d'une déformation de sens opposé à celui de l'ondulation initiale.
- 10 - 2° / Passage en continu de la canelure ainsi obtenue dans un premier conformateur de type approprié à la forme de celle-ci, ce conformateur pouvant être à refroidissement, soit par liquide réfrigérant, soit à coussin d'air à basse pression ; on obtiendra ainsi une pré-solidification contrôlée par un déroulement à grande vitesse et réglage indépendant de chaque partie du conformateur, voir même une solidification complète par
- 15 déroulement à petite vitesse.
- 3° / Fabrication en un point convenablement disposé, par l'un quelconque des moyens classiques ou autres de deux feuilles, soit indépendantes, elles pourront être alors différentes en nature ou en épaisseur, soit de même nature et obtenues avec une filière double à épaisseur variable. Cette
- 20 unité de fabrication peut être suivant les types de produits à obtenir remplacée par l'emploi de rouleaux de feuilles préchauffées ou non.
- 4° / Application en un point défini, simultanément ou en position étagée de deux films ou feuilles sur la canelure, le contact et l'adhérence étant
- 25 déterminés par les conditions suivantes : l'ame ondulée devra présenter une rigidité relative tout en conservant une adhérence de surface suffisante pour permettre d'appliquer intimement de chaque côté un film ou une feuille, par simple contact. On peut également envisager l'opération inverse consistant à appliquer sur chaque face d'une canelure complètement refroidie soit simultanément, soit en deux opérations un film ou
- 30 une feuille sortant directement d'une filière ou préchauffés de manière à obtenir une adhérence de surface. A noter que pour des structures de formes et dimensions très importantes il peut être bon de prévoir sur chaque face de la canelure une contre-dépouille améliorant mécaniquement l'adhérence des feuilles sur celles-ci. Ces types d'application pourront
- 35 se faire directement par l'intermédiaire de rouleaux de contact, ou bien à l'entrée d'un conformateur de gabarit ; par ailleurs, pour obtenir une meilleure tenue de la canelure au moment de l'application des films ou des feuilles on peut adjoindre un système de tubulures venant injecter, soit de l'air comprimé, soit un gaz neutre, soit une mousse quelconque à

REVENDICATIONS

Je demande un brevet d'invention en ce qui concerne la fabrication et l'exploitation des structures complexes comportant :

- 1°/ une lame intérieure de forme ondulée obtenue par passage en continu d'une feuille plane encore plastique entre des formes lui imprimant des ondulations perpendiculaires au sens du déroulement de la feuille, ces formes peuvent être à glissements ou de type galets ou rouleaux tournant, les ondulations pourront être alternées par un mouvement de va et vient des formes à glissement ou par l'emploi de galets ou de rouleaux présentant des différences de forme sur leur circonférence ; de plus, on pourra adjoindre à ces diverses méthodes des galets ou des dispositifs à pression tendant à opérer sur la canelure des déformations latérales opposées à l'ondulation de celle-ci .
- 2°/ la fixation en continu d'une ou de deux feuilles de recouvrement de l'ame ondulée, sans emploi de produit complémentaire, l'adhérence étant obtenue uniquement par l'état de la matière en surface, soit de l'ame ondulée, soit des feuilles de recouvrement, état qui permet de rendre les divers éléments solidaires par simple application ; des contre-dépouilles pouvant éventuellement être prévues pour obtenir des qualités mécaniques supérieures .
- 3°/ les procédés de fabrication en continu de telles structures, ainsi que les méthodes et outillages découlant de ma technique .

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Fig. 9

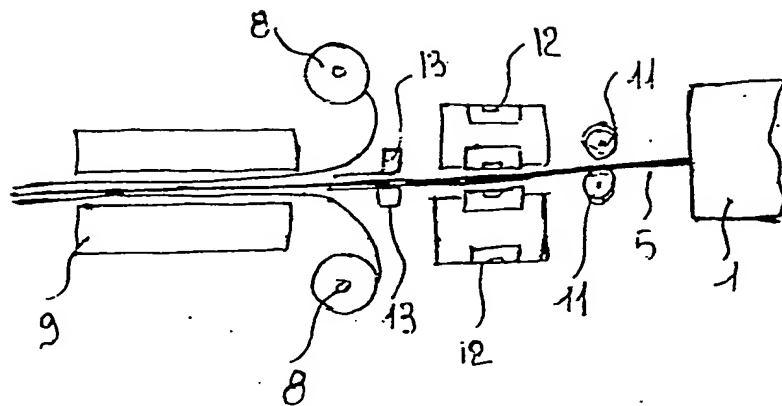


Fig-10

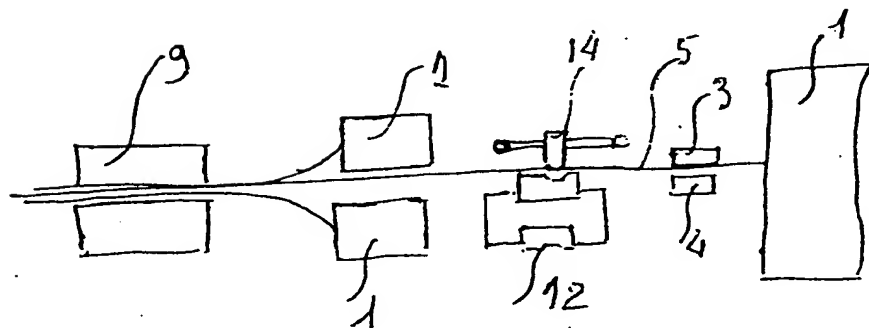


Fig. 12

Fig 11

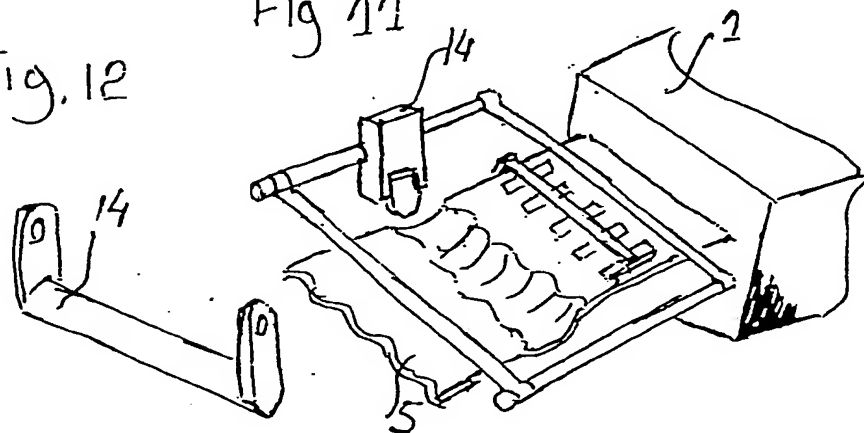


Fig 13

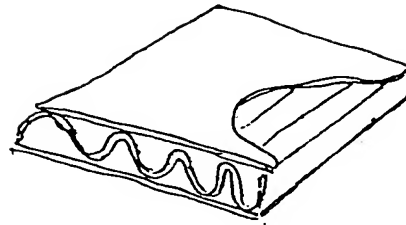


Fig 14

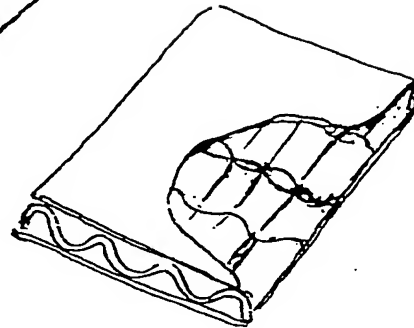


Fig 15

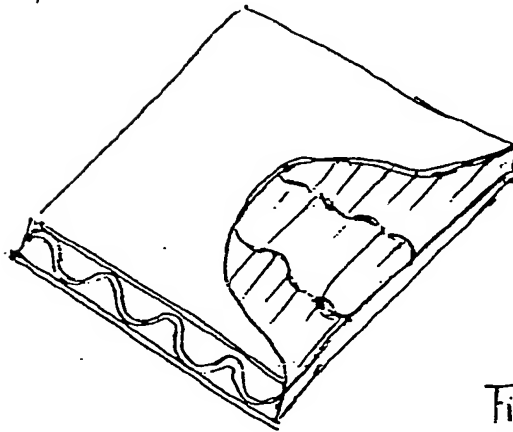
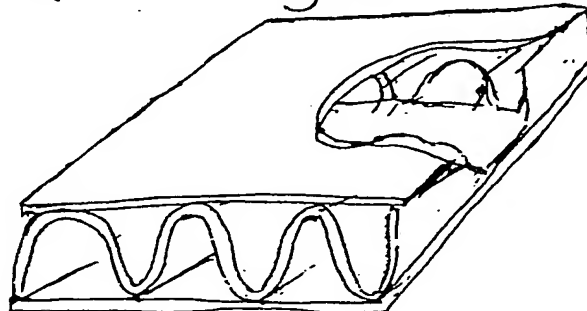


Fig 16



FRENCH ADDITIONAL PATENT APPLN NR 70.17533
PUBLICATION NR 2.088.069

5

COMPLEX STRUCTURES INCLUDING A WEB WITH SINGLE OR MULTIPLE CORRUGATIONS, OF EXPANDED OR NOT EXPANDED THERMOPLASTIC RESIN, AND ASSEMBLAGE VIA CONTACT OF DIFFERENT ELEMENTS. IMPROVEMENT MADE ON THE EXECUTION OF SAID STRUCTURES.

10

Up to now, light structures of plastic materials have been obtained, either in non traditional form, or by manufacturing procedures comprising a film incorporated on one face of the corrugated web, and repeated fixation by gluing of a second film on the second face thereof; moreover, the forms of the structures obtained up to now, do not, particularly within the domain of packing, permit the use of existing traditional manufacturing equipment.

15

To the principal invention, the purpose of which is to provide structures with corrugated web of simple or multiple channel type, with assemblage, either immediately or at the final operation, of two films, on both faces of the corrugated web, this obtained by simple contact, said structures may be intended for packing or for much more special use, the forms, dimensions, thickness of the different elements or the choice of base materials may be specific for the requested use, I wish to contribute with the following improvements:

20

25

-1 - Manufacturing of the corrugated or grooved web

30

a) continuous manufacturing of a simple or double sheet which penetrates, at the outlet of the drawing block with variable thickness, under a double fixed form, which forces said sheet to reproduce a groove of simple or double type in the unwinding direction of the sheet.

35

b) continuous manufacturing of a sheet according to the particulars defined above, wherein the double rigid form thereof presents a lateral alternating movement, during the unwinding of the sheet, and in a plane perpendicular to said sheet, said periodic movement intended to provoke a regular and alternating displacement of the waving of the grooves.

40

c) continuous manufacturing of a sheet which at the outlet of the drawing block will come into engagement with a set of rolls of appropriate form, and rotatably driven in the unwinding direction, said rolls either forming a multiple of rolls, or a type of roller; it is thus possible to obtain waving grooves of

a constant directional form, or, imagining the use of a chain of rolls or rollers, one or several parts of the circumference thereof being concave, or the other or the others being in relief, grooves, the waving of which thus extend in a plane parallel in the unwinding direction of the sheet and with rotational movement of the roll or the rollers, an inversion of the undulation, the pitch of which being
5 determined by the diameter of the rolls or of the roller. In case of very particular grooves, one could use several chains of rolls with successive operational courses.

10 d) continuous manufacturing from a sheet, corrugated via any of the means mentioned above, using a roll or any form with pressure and at intervals determined by an undulation or by a deformation in the opposite direction to that of the initial undulation.

15 -2 - Continuous passage of the grooves thus obtained in a first forming device of a type appropriate to the form thereof, said forming device may be subject to refrigeration, either by liquid refrigerant, or by a low pressure air cushion; one will thus obtain a pre-solidification controlled by unrolling at high velocity
20 and independent control of each part of the forming device, even a complete solidification via unrolling at low velocity.

-3 - Manufacturing at a point suitably disposed, by means of any classic or other means, of two sheets, either independent, in which case they may be
25 of different nature and thickness, or being of the same nature and obtained with a double sheet having variable thickness. This fabrication unit may, depending on the product types to be obtained, be replaced by using rollers with pre-heated or not pre-heated sheets.

30 -4 - Application in a defined point, simultaneously or in position one above the other of two films or sheets on the corrugation, the contact and the adherence being determined by the following conditions: the corrugated web should present a relative rigidity, at the same time preserving a sufficient surface adherence in order to permit on each side intimate application of a film by
35 simple contact. It is also possible to foresee the inverse operation, consisting in the application on each face of a completely chilled corrugation, either simultaneously or in two operations, of a film or sheet coming directly from a drawing block, or pre-heated for obtaining surface adherence. It may be noted that in case of structures having forms and dimensions of great importance,
40 it may be good to provide on each face of the grooved web an undercut for mechanically improving the adherence of the films. Said types of application could be carried out by using contact rollers, or at the entrance of a

forming template ; besides , in order to obtain an improved state of the grooved web at the moment of application of the films or of two sheets , it is possible to add a system of tubes for injecting , either compressed air, or a neutral gas , or any foam having several components polymerising during the passage of the grooved web under the roller or in the forming device. It should be noted that in case of grooves with alternating waving, as defined in &1 (b,c,d), a great number of said grooves being completely closed, thus due to storing of air, of a gas or of a foam, this will provide a great improvement of the qualities of said structure (mechanical properties, heat isolation properties)

EXPLANATORY DRAWINGS

Fig 1 - schematical view of an adjustable drawing block with corrugated form.
1) drawing block plate, 2) roll for maintenance and drawing, 3) upper form, 4) lower form, 5) plastic sheet (film)

Fig 2 - detail of fixed form enabling the execution of a simple corrugation, (the air cushion system and refrigerating system not shown in the figure)

Fig 3 - diagram of a complete installation comprising a form with pre-controlled lateral movement. 6) upper form with lateral movement, 8) roller with film, 7) lower form with lateral movement, 9) refrigerated forming device

Fig 4 - diagram showing the forming of simple corrugations by using a roll

Fig 5 - device having a multitude of rotating rolls, the corrugation being formed by alternating contact with said rolls.

Fig 6 - rotating device with a single roll.

Fig 7 - diagram of a complete installation with a multitude of rolls, for a corrugation with alternating grooves 11) multiple rolls,

Fig 8 - roll for alternating corrugation in the unwinding direction of the sheet.

Fig 9 - diagram of a complete installation comprising : 12) set of double holding jig, 13) injection of a product at the moment of application of sheets (device for lateral displacement , not shown)

Fig 10 - installation with : 14) pre-defined lateral forming, complete refrigeration of the corrugation and application of adhering sheets

Fig 11 - diagram with roll for lateral deformation.

Fig 12 - pressure device for lateral deformation

5 Fig 13 , 14 , 15 , 16 - different types of corrugations obtained.

10 The complementary industrial possibilities of the structures of plastic materials provided by the present improvements are important, since in addition to the improvements of the structures provided by certain of said techniques, other marketing possibilities have become economically possible, for instance within the building industry, partition walls, within the storing business : pallets.

CLAIMS

5 I request a patent of invention with respect to the fabrication and exploitation of complex structures, comprising :

10 -1) an internal web having corrugated form obtained by continuously causing a still plane plastic sheet to pass between forming means impressing corrugations perpendicularly of the unwinding direction of the sheet, said forms may include sliding means or be of the type with revolving rolls or rollers, said corrugations may be alternating by a movement to and fro of the sliding forms or by using rolls or rollers presenting differences in the form of the circumference thereof ; moreover , it would be possible to add to said different methods
15 rolls or pressure devices tending to provide lateral deformations on the corrugations, said lateral deformations being directed opposite to the undulation of said corrugations.

20 -2) continuous fixation of one or two covering films (sheets) of the corrugated web, without using any complementary product, the adherence being obtained exclusively by the condition of the surface material, either of the corrugated web or of the covering films (sheets) said condition permitting fixation of the different elements by simple application ; undercuts could possibly be used in order to obtain superior mechanical properties.

25 -3) the continuous process for manufacturing said structures , as well as the methods and equipment derived from my technique.